



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

nw

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,951	09/20/2001	Masayuki Shimizu	Q66266	9974

7590 01/12/2004
SUGHRUE, MION, ZINN, MACPEAK & SEAS
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037

EXAMINER

PHAM, HAI CHI

ART UNIT PAPER NUMBER

2861

DATE MAILED: 01/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/955,951

Applicant(s)

SHIMIZU ET AL.

Examiner

Hai C Pham

Art Unit

2861

NW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 23-25 and 29 is/are rejected.
- 7) ☒ Claim(s) 20-22 and 26-28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 27 and 28 are objected to because of the following informalities:

Claim 27:

- Line 1, "diffusion plate" should read --diffusion device-- to keep the consistency of the claimed terminology.

Claim 28:

- Line 2, "diffusion plate" should read --diffusion device--.
- Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10, 18, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda (JP 4-284484) in view of Yano (U.S. 4,734,734).

Maeda discloses an optical printing head (2) comprising a plurality of light emitting elements (LEDs L1-Ln) mounted on a substrate (12) and arranged along a perpendicular direction to the conveying direction of said photosensitive material (Fig. 4), a partitioning device (partitioning wall 10) mounted on said substrate, for partitioning

said light emitting elements from each other, to prevent interference between rays from adjacent ones of said light emitting elements, a diffusion device (diffusion plate 15, Fig. 3B) for diffusing rays from said light emitting elements, to equalize luminance of rays from each light emitting element (Fig. 3A), each of said light emitting elements being assigned to record a dot at a time when driven in synchronism with the conveying movement of said photosensitive material, thereby to print said latent image line by line.

However, Maeda does not explicitly disclose the converging lens system for projecting rays from said light emitting elements onto said photosensitive material (claim 1), the mask plate with openings (claim 2), less than all of the light emitting elements are activated to emit light at a single time for generating specific patterns on the photosensitive material (claim 29).

Regardless, it is well known in the printing art that such converging lens system is necessary to a printing system for focusing the light beam onto the surface of the photosensitive material to form a sharp image as evidenced by Yano, which discloses an image forming apparatus comprising a plurality of light emitting elements (LEDs 12) mounted on a substrate (not shown) and arranged along a perpendicular direction to the conveying direction of said photosensitive material (image bearing member 6) (col. 3, lines 29-49), thin/thick lateral walls (20) for partitioning said light emitting elements from each other to prevent interference between rays from adjacent ones of said light emitting elements, a mask plate (or light blocking means 18) with rectangular apertures (22) associated with respective LED elements so as to apply light rays with effective and/or desired area proportional to the aperture onto the surface of the image bearing

member (6), and a converging lens system (14) for decreasing the divergent angle of the light rays so as to effectively condense the light rays to the image bearing member such that no overlapping exists between the illumination areas on the surface of the image bearing member (Fig. 4). Moreover, with respect to claim 29, Yano teaches some of the light emitting elements in the array being used to form patterns in the image area A of the image bearing member (6).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the lens system, the mask plate with apertures as taught by Yano in the device of Maeda. The motivation for doing so would have been to allow effective light rays to reach the surface of the image bearing member within the desired area delimiting the printed dot as well as to further condense the light rays onto the surface of the image bearing member to form a sharp dot as suggested by Yano at col. 4, lines 1-4 and 45-48.

With regard to claims 4-5 and 7-9, Maeda further teaches each light emitting element being coated with a protective resin coating, which surrounds each LED element as shown in Fig. 2B, and the diffusion device can be provided either as a diffusion plate (15, Figs. 2B and 3B) mounted on the partitioning wall or as light diffusing particles mixed into the protective resin coating (17, Fig. 3D).

With regard to claim 10, Maeda further teaches the light emitting elements being arranged either in a single row (Fig. 4) or in a plurality of rows (Fig. 5), each extending in the perpendicular direction to the conveying direction of the photosensitive material.

With regard to claim 18, Maeda teaches the light emitting elements being arranged in-between portions of the partitioning device (Figs. 1B, 2B).

4. Claims 11-13, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of Yano, as applied to claims 1, 10 above, and further in view of Gomi et al. (U.S. 6,037,964).

Maeda, as modified by Yano, discloses all the basic limitations of the claimed invention including the exposure head having a plurality of rows of light emitting elements (Maeda Fig. 5), where the light emitting elements of each row are spaced from each other by a distance less than a length of each light emitting element (the light emitting elements are separated from each other by the thickness of the partitioning wall). However, Maeda, as modified by Yano, fails to teach the staggered arrangement of these rows (claim 11), adjacent two rows of the light emitting elements being paired to emit rays of a different color from other pairs of row of the light emitting elements (claim 12), and the light emitting elements being aligned in both widthwise and lengthwise of the photosensitive material (claim 13), the plate-like partitioning device (claim 19).

However, Gomi et al. discloses an exposure head comprising a plurality of rows of light-emitting elements (31-33) formed in a zigzag arrangement (Figs. 6, 8), each of the light emitting elements being shielded from the others by partitioning walls (formed on the planer portion 26), wherein adjacent two rows of the light emitting elements (the two rows of green light emitting elements 32) being paired to emit rays of a different

color (green) from other pairs of row of the light emitting elements (e.g., the pair of blue light emitting elements 33), and the light emitting elements (e.g., first, third and fifth rows) being aligned in both widthwise and lengthwise of the photosensitive material, and emitting rays of different colors (green, red, and blue, respectively).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Maeda with the aforementioned teaching of Gomi et al. for the purpose of providing a high resolution of printed dots.

5. Claims 14-17, 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of Yano and Yamakawa (U.S. 5,923,358).

Maeda in view of Yano (see related rejection in paragraph 2 above) discloses all the basic limitations of the claimed invention except for the plurality of printing heads, and the dichroic mirrors.

However, Yamakawa discloses an image forming device having either a single printing head (Fig. 1) or three printing heads (Fig. 4), each printing head comprising a plurality of light emitting elements (light emitting element arrays 21a-21c corresponding to the three primary colors) whose emitted light beams are synthesized by the dichroic mirrors (24a, and 24b) (col. 4, lines 8-16) to form parallel beams on the same optical axis, wherein the dichroic mirrors allow red rays to pass therethrough and at least one of the dichroic mirrors allows green rays to pass therethrough.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Maeda, as modified by Yano, with

the aforementioned teaching of Yamakawa for the purpose of recording color image on the photosensitive material with combined light sources of three primary colors.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of Yano, as applied to claim 16 above, and further in view of De Cock et al. (U.S. 4,524,3720).

Maeda, as modified by Yano, discloses all the basic limitations of the claimed invention except for the rays from the respective light emitting elements being projected at different angles toward a single portion of the photosensitive material.

De Cock et al. discloses a recording apparatus for linewise recording information on a moving photoreceptor, the apparatus having a printhead comprising a plurality of light emitting element chips arranged on the same substrate in parallel rows (26-29) in a staggered relationship (Figs. 6, 14), wherein the light rays emitted from the respective light emitting elements are projected on the photoreceptor (20) by means of the optical system (12) to form a linewise image (30) on a single portion of the photoreceptor (Fig. 3).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide modify the device of Maeda with the optical setup as taught by De Cock et al. The motivation for doing so would have been to provide a simple optical arrangement allowing the plurality of radiation sources disposed in parallel rows on a flat substrate to form a linewise image on a single portion of the photosensitive material.

Allowable Subject Matter

7. Claims 20-22, 26-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The primary reason for the indication of the allowability of the claim 20 is the inclusion of the limitation "light emitting elements positioned in the first and the second rows are offset from each other, so as to have a minimum overlap in the conveying direction of said photosensitive material", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of claim 26 is the inclusion of the limitations "the plurality of light emitting elements have a dark spot at a radially center portion" as well as "the diffusion device equalizes the luminance difference between the dark spots and the remaining portions of the light emitting elements", in the combination as currently claimed, which are not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of claim 27 is the inclusion of the limitation "the diffusion [plate] device is semi-transparent, and comprises an array of micro lenses of a several micro millimeter size", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of claim 28 is the inclusion of the limitation "luminance reduction through the diffusion [plate] device is less than that of a luminance reduction through a diffusion plate of fogged glass", in the combination as currently claimed, which is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

Claims 21-22 are allowed since they are dependent from claim 20 above.

Response to Arguments

8. Applicant's arguments with respect to claims 1-19, 23-25, and 29 have been considered but are moot in view of the new grounds of rejection as presented in this Office action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (703) 308-4896. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432.

Application/Control Number: 09/955,951
Art Unit: 2861

Page 10

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A handwritten signature in cursive script, appearing to read "HAI PHAM".

HAI PHAM
PRIMARY EXAMINER

January 6, 2004